Port Said Governorate Directorate of Education Science Supervision	Examination for Completing the Preparatory Education Certificate 2025/2026– Pilot Model – Second Semester	Subject: Science Time: 2 Hours

Question: One

A) Put a tick (√) or a cross (x) in front of the following statements:

1. When hydrochloric acid is added to copper turnings, no reaction occurs. (√)
2. The transfer of electric charge between two touching conductors depends on the current intensity of the conductors. (x)
3. Removing the stamens of pea plants prevents them from cross-pollinating. (x)

B) 1. Clarify with symbolic equations the effect of heat on each of the following:

A. Red mercury oxide $2HgO \xrightarrow{\Delta} 2Hg + O_2$

B. Sodium nitrate $2NaNO_3 \xrightarrow{\Delta} 2NaNO_2 + O_2$

2. What is meant by the electric potential difference across a conductor is 5 volts.

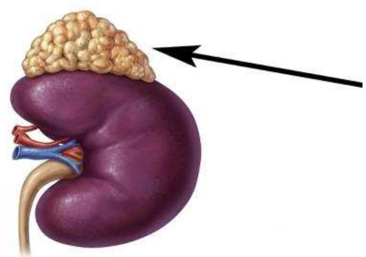
- **Answer:** The amount of work done to transfer a quantity of electricity of 1 coulomb between the ends of the conductor equals 5 joules.

C)

1. What happens if:

- The body's cells are unable to absorb glucose sugar.
- **Answer:** Infection with diabetes mellitus.

2. In the opposite figure



1. What is the name of the gland indicated by the arrow?
   Answer: The adrenal gland
2. State the name of the hormone secreted by this gland? And what is its importance?
   Answer: Adrenaline hormone, and it works to stimulate the body's organs to respond to emergencies.

Question Two

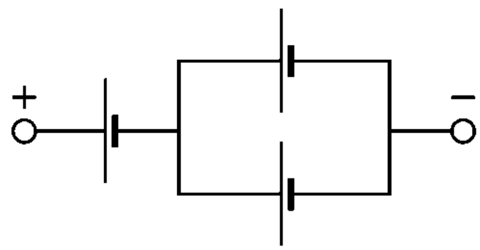
1) State the scientific term indicating each of the following statements:

A. A hormone that has the element iodine in its structure. (Thyroxine)
B. The resistance of a conductor through which an electric current of 1 ampere passes when the potential difference between its ends is 1 volt. (Ohm)
C. Discovered the emission of invisible rays from the uranium element that have the ability to penetrate solid materials. (Scientist Henri Becquerel)

2) What happens when.......?

A. Adding an acid to an alkali.
Answer: Salt and water are formed.
B. Increased secretion of growth hormone during childhood.
Answer: Infection with gigantism disease.

3. In the opposite figure (battery calculation):



If the electromotive force (emf) of one cell is 1.5 volts, calculate the total emf of the battery.

Answer: Emf of the battery = 1.5 + 1.5 = 3 volts

C)

1. Compare between:

Ammeter and voltmeter in terms of the method of connection in the electric circuit.

Ammeter	Voltmeter
Connected in series	Connected in parallel

2. Give reason: Radioactivity has natural and artificial sources.

Answer: Because there is spontaneous radiation in nature emitted from radioactive elements or from cosmic rays coming from outer space, and there is also artificial radiation released during nuclear reactions occurring in nuclear reactors or atomic bombs.

Question Three

A) Complete the following statements with what suits them:

A. Learning to swim is an **acquired trait**, while blood type is an **inherited** trait.
B. Electric cells produce **direct** current, while generators produce **alternating** current.
C. The **airbag** is considered one of the most important safety features in modern cars, as it fills with nitrogen gas.

B)

1. Calculate the current intensity resulting from the passage of an electrical quantity of 3000 coulombs through a cross-section of a conductor in 3 minutes.

Answer: Current intensity $= \frac{\text{Quantity of electricity}}{\text{Time in seconds}} = \frac{3000}{3 \times 60} = \frac{3000}{180} =$ 16.6 Amperes.

2. What are the results of: Increasing the number of electric cells connected in series with respect to the electromotive force.

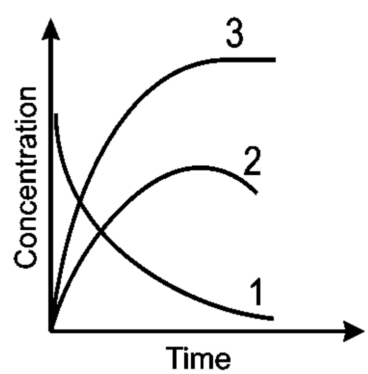
Answer: The electromotive force of the battery increases.

3. What is meant by each of:

- **The gene:** The gene is a part of the DNA found on the chromosome and is responsible for showing a genetic trait of the living organism.
- **Mendel's Second Law:** If two pure individuals differing in two or more pairs of contrasting traits mate, the traits of each pair are inherited independently, and they appear in the second generation in a ratio of 1:3.

C)

1. The following figure shows the decomposition of sulfur trioxide into sulfur dioxide and oxygen according to the following equation:



$$2SO_3 \overset{\Delta}{\rightarrow} 2SO_2 + O_2$$

1. After the end of the reaction, the concentration of SO_3 is **zero**.

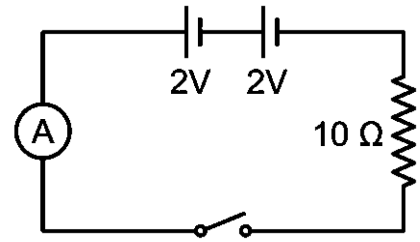
2. State what each graph line represents of the elements and compounds in the previous equation?

   Graph line (1) represents: SO_3 (Reactant)

   Graph line (2) represents: O_2 (Product with lower coefficient)

   Graph line (3) represents: SO_2 (Product with higher coefficient)

2. Calculate the ammeter reading:



Answer: Ammeter reading (I) = V (E) for the battery / R = (2x2) / 10 = 0.4 Amperes.

Question Four

A) Choose the correct answer from the following:

1. If the quantity of electricity passing through a conductor decreases to half, then the electric current intensity .... at a constant time.

   a- decreases to half   b- doubles

   c- increases to four times   d- does not change

2. The substance that changes the speed of the reaction and does not change is called the ....

   a- oxidizing   b- reducing   c- active   d- catalytic

3. The recessive trait appears in one of the offspring if they inherit from the parents....

   a- two dominant genes   b- one dominant gene

   c- two recessive genes   d- one recessive and one dominant gene

B) Explain:

1. The speed of a chemical reaction increases by increasing the concentration of the reactants.

   Answer: Due to the increase in the number of collisions between molecules.

2. Genetic information is found in DNA.

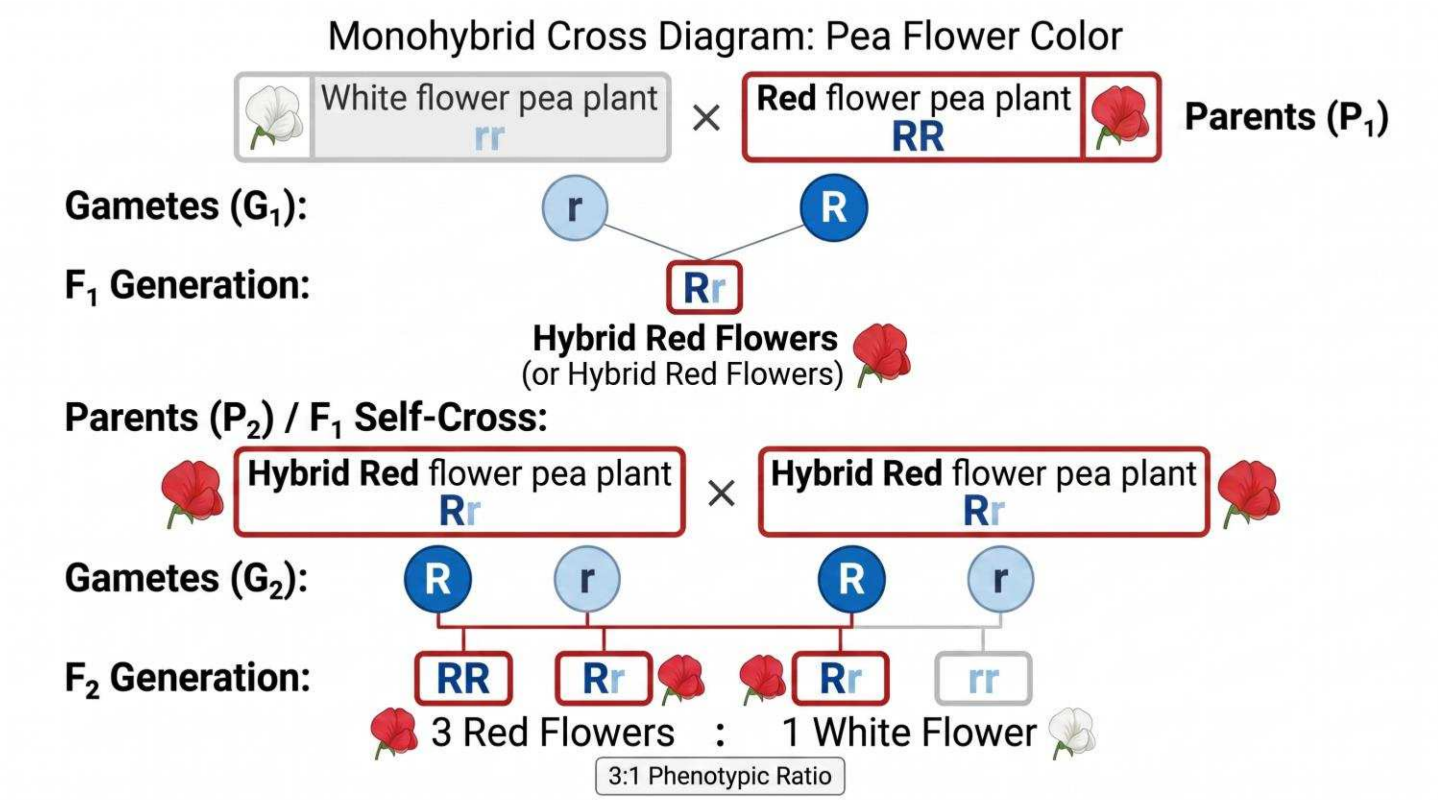
   Answer: Because it consists of genes responsible for showing genetic traits.

C) 1. Find one difference between:

Positive catalysis reactions and negative catalysis reactions.

Positive catalysis reactions	Negative catalysis reactions
The catalyst increases the speed of the reaction	The catalyst decreases the speed of the reaction

2. Clarify on a scientific basis the result of mating a pure red-flowered pea plant with a white-flowered pea plant. Mentioning the ratio between the resulting individuals up to the second generation, clarifying the gametes.




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